4.10 NOISE

This section describes the noise environment in the vicinity of the proposed Project and the potential impacts associated with the Project. The analysis is based on field surveys, area planning documents, other project EIRs, and discussions with appropriate agencies.

4.10.1 Environmental Setting

Definitions

Noise is defined as unwanted sound that is heard by people or wildlife and that interferes with normal activities or otherwise diminishes the quality of the environment. Sources of noise may be transient, e.g., the passing of a train or aircraft through the area, or continuous, e.g., the hum of distant traffic or the operation of air conditioning equipment. Sources of noise may have a broad range of sounds and be generally nondescript or have a specific, readily identifiable sound, such as a car horn. The sources of noise may also be steady or impulsive. These characteristics all bear on the perception of the noise environment.

Sound is measured on a logarithmic decibel (dB) scale of air pressure relative to a reference intensity of one micropascal (µPa) for underwater measurements, or 20 µPa for measurements in air. The 20 µPa is near the threshold of normal human hearing. Because it is a logarithmic scale, an increase of 10 decibels represents a 10 times increase in the sound energy.

Sound energy is measured by averaged sound levels over a given time period, producing an equivalent sound level, or L_{eq}. The L_{eq} is defined as the sound level that would produce the same amount of energy as all the sound events that occur during the measurement period.

Effects on Humans

Human response to noise is dependent not only on the magnitude, but also on the characteristic of the sound, or the sound frequency distribution. Generally, the human ear is more susceptible to higher frequency sounds than lower frequency sounds. This is reflected in the A-weighting that is designed to give greater measure to sounds that humans can hear, and none to those sounds that humans cannot hear. The A-

weighting has a weighting of zero for sounds with a frequency below 10 cycles per second, and has a maximum weighting for sounds with a frequency in the 2,000 to 5,000 cycles-per-second range.

Human response to noise is also dependent on the time of day and expectations based on location and other factors. For example, a person sleeping at home might react differently to the sound of a car horn than to the same sound while driving during the day. The regulatory process has attempted to account for these factors by developing time-based noise ratings, such as Community Noise Equivalent Level (CNEL) and the day-night (L_{dn}) rating, which incorporate penalties for noise occurring at night. The CNEL rating is an average of noise over a 24-hour period, in which noises occurring between 10:00 p.m. and 7:00 a.m. are increased by ten dBA, and noises that occur between 7:00 p.m. and 10:00 p.m are increased by five dBA. The day-night rating is an average value that assigns a penalty of ten dBA to noises that occur between 10 p.m and 7 a.m.

Figure 4.10-1 is a scale showing typical noise levels encountered in common daily activities.

The effects of noise are considered in two ways: how a proposed Project may increase existing noise levels and affect surrounding land uses, and how a proposed land use may be affected by existing surrounding land uses. The Santa Barbara County Comprehensive Plan Noise Element and City of Goleta General Plan Noise Element focus on particular types of land uses when measuring the effects of noise, particularly land uses that have been determined to be “sensitive receptors.”

Sensitive noise receptors are defined as users, or types of uses, that are interrupted (rather than merely annoyed) by relatively low levels of noise. Such receptors include residential neighborhoods, schools, libraries, hospitals and rest homes, auditoriums, certain open space areas, and public assembly places (Goleta General Plan 2006).

Two noise levels are examined in this report: the maximum short period (one to five second) noise level, or sound exposure level (SEL), and the CNEL discussed above. The SEL gives an indication of the amount of changes in the noise that occur during a maximum period, and the CNEL gives an indication of the noise level averaged over a 24-hour period, with the five and 10 dBA evening and night adjustments discussed above.

Figure 4.10-1
Common Environmental Noise Levels

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
Chain Saw	110	Rock Band
Jet takeoff at 2 miles		
Ambulance siren at 100 feet	100	
Gas Lawnmower at 3 feet		
		Food Blender at 3 feet
	90	
Diesel Truck at 50 feet		
		Garbage Disposal at 3 feet
	80	Shouting at 3 feet
Gas Lawnmower at 100 feet		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Conversation at 5 feet
Small plane landing at ¾ miles	60	
		Air Conditioner Large Business Office Dishwasher Next Room
Quiet Urban Daytime	50	
Light Traffic at 100 feet		Distant Birds
Quiet Urban Nighttime	40	
Quiet Suburban Nighttime		Library
	30	Soft Whisper, Bedroom at Night
Quiet Rural Nighttime		
	20	
		Broadcast and Recording Studio
	10	
	0	Threshold of Hearing

Source: Adapted from FAA 2005

The impact of noise is also a function of the changes that the new noise introduces to an area. When a new noise source is introduced, most people begin to notice a change in environmental noise levels at approximately three to five dBA, depending on the noise characteristic. Typically, average changes in noise levels of less than three to five dBA cannot be definitely considered as producing an adverse impact. For changes in levels above five dBA, it is difficult to quantify the impact beyond recognizing that greater noise level changes would result in greater impacts.

The impact of noise is also a function of the changes that the new noise introduces to an area. When a new noise source is introduced, most people begin to notice a change.

Effects on Wildlife

Wildlife response to noise is dependent not only on the magnitude, but also by the characteristic of the sound, or the sound frequency distribution. Wildlife is affected by a broader range of sound frequencies than humans. Noise is known to affect an animal's physiology and behavior, and chronic noise-induced stress is deleterious to an animal's energy budget, reproductive success, and long-term survival (Radle 2001). Noise impacts to marine wildlife are detailed in Section 4.5, Biological Resources.

Project Area Overview

Major sources of noise in the Project area include surf noise (breaking waves) along the beach, occasional aircraft overflights (Santa Barbara Municipal Airport is approximately 1.8 miles [3.0 km] from the EMT and 3.4 miles [5.7 km] from the EOF), processing noise generated by the EOF, and on-road traffic primarily associated with Highway 101 and the railroad.

The primary sources of noise at the EOF are processing equipment noise, including the gas compressors, the HIRT burners, gas processing equipment at the LOCAT unit, pumps, alarms and annunciators. The western boundary of the EOF is surrounded by trees and by a small rise or hill which separates the facility from Haskell's public beach and the Bacara Resort. On the eastern side of the EOF is a small rise/hill on top of which lies the Sandpiper Golf Course. Directly to the south of the EOF is the beach and to the north is the access road, parallel to which is Highway 101. The closest residence to the EOF is located on Vereda Cordillera approximately 1,500 feet (457 m) away to

the north of Highway 101. The Sandpiper Golf Course clubhouse/restaurant is located about 1,100 feet (335 m) away. The closest room at the Bacara Resort is located about 2,100 feet (640 m) away.

The primary source of noise at the EMT is caused by the shipping pumps used for loading the Barge *Jovalan*. The pumps currently operate an average of 24 times per year, 10 to 12 hours per loading. Loadings occur both during the day and night.

On the north and east sides, the EMT is surrounded by trees that provide partial attenuation of the noise from the facility. The EMT is located within currently undeveloped land designated Open Space (see Section 4.7.1, Governing Land Use Plans). Currently, this land contains numerous pedestrian, equestrian, and/or bicycle trails that are used by the public for recreation; one trail is as close as 150 feet (46 m) to the north and west of the EMT boundary. Several public beach areas are located within 1,000 feet to 1,200 feet (305 m to 366 m) to the south and west of the EMT boundary. Currently, the closest existing and proposed residential areas are within 1,900 feet (579 m) to the north of the EMT boundary.

The Barge *Jovalan* mooring system is located approximately 2,600 feet (792 m) offshore. Noise from activities at the barge, e.g., tug and assist boat engines, and barge vapor recovery unit engines are minimal at the public beach or trails, because of the dominant background noise of the surf (see EMT Lease Renewal FEIR).

Baseline noise measurements were conducted to collect baseline noise levels. Noise levels were generally produced by the ocean surf for locations near the beach, by traffic on Highway 101 for areas close to the Highway, and traffic on nearby local roads. Noise from aircraft overflights associated with the Santa Barbara Airport could be heard from all locations. Background noise levels measured in the study area are shown in Table 4.10-1. Figure 4.10-2 shows a map of the background-noise-monitoring locations.

Noise levels were measured on the south side of the EOF at the Sandpiper Golf Course 11th-hole fairway, and at the north side of the EOF along the access road at the west gate. Maximum SEL noise levels were associated with annunciators, or alarms, which generated maximum noise levels of 68.2 dBA SEL at the Sandpiper Golf Course, and 78.2 dBA SEL at the EOF west gate.

The Goleta General Plan includes noise contours related to transportation sources of noise, such as Highway 101, major roadways, the railroad, the airport, as well as some

background/existing noise measurements at specific locations. These include noise levels between 65 and 70 dBA along the EOF access road and Calle Real due to Highway 101 and railroad noise, and noise levels of 55 dBA at the Ellwood School.

Table 4.10-1
Baseline Noise Levels in the Project Area

Area and Location/ Sensitive Receptor	Major Noise Sources	Distance to Source feet (m)	L_{eq}, dBA			
			Day	Eve.	Night	CNEL
1. EOF – In front of Western EOF gate [a]	Gas processing equipment	120 (36)	67.0	68.7	68.7	75.2
2. EOF – Sandpiper 11th Hole fairway	EOF HIRT units, Surf	160 (50)	58.4	57.0	57.0	63.8
3. EOF – Haskell's Beach [a]	Surf, daytime beach users	1,400 (428)	62.8	62.2	62.2	68.9
4. EOF – Bacara Resort and Spa, east end [a]	Hotel, Hwy traffic, surf	2,100 (640)	53.7	46.1	46.1	54.6
5. EMT - Closest pedestrian and biking trail [b]	Traffic, EMT, aircraft	150 (46)	49.6	56.3	51.3	58.6
6. EMT - Public walking trails on ocean bluff [b]	Surf	1,000 (305)	63.8	63.0	58.0	66.4
7. EMT - Residences to the northeast of the EMT [b]	People, aircraft	1,900 (579)	53.6	51.4	46.4	55.2
8. EMT – Student Housing to the east of the EMT [b]	Traffic, aircraft	2,500 (762)	57.9	53.2	48.2	58.1
9. EMT - Devereux School [b]	Cars, trucks, aircraft	2,300 (701)	54.1	55.2	50.2	58.1
10. Pipeline Route – Vereda Leyenda and Calle Real Rd	Hwy traffic	50 (15)	61.6	61.1	54.2	63.5

Notes:

Day is from 7 a.m. to 7 p.m.; evening is from 7 p.m. to 10 p.m.; and night is from 10 p.m. to 7 a.m.

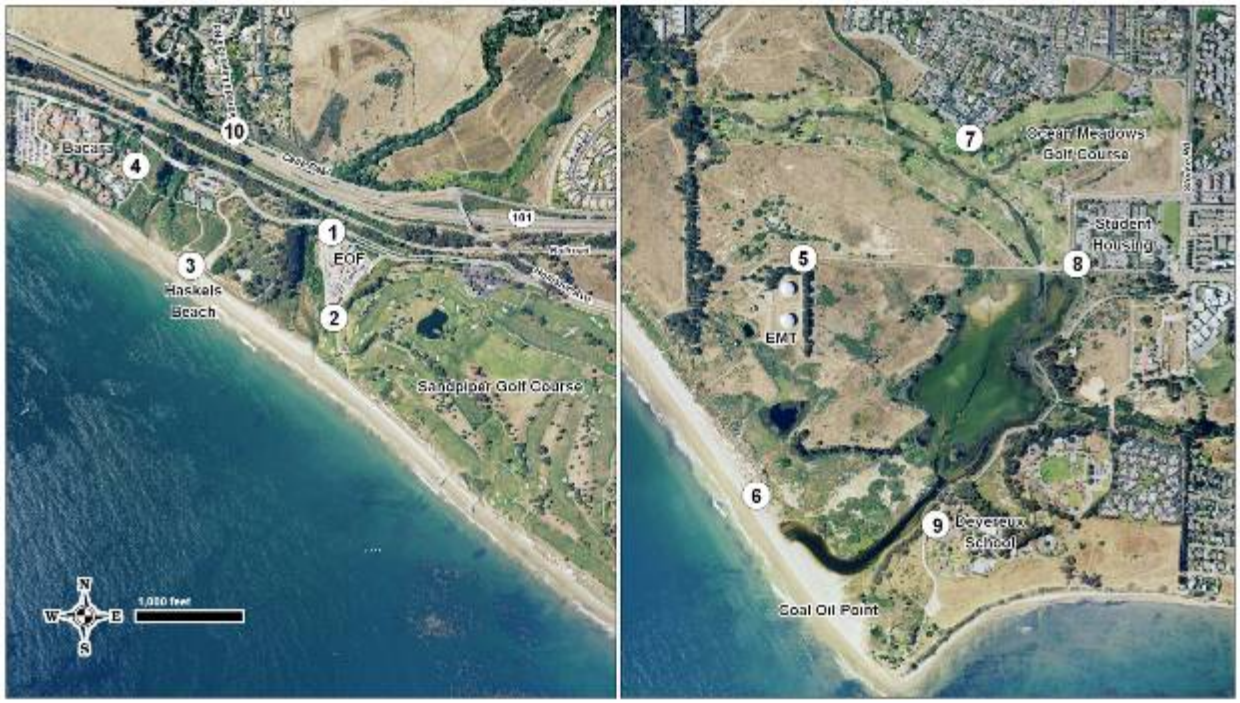
[a] Measured date 6/12/07 and 6/13/07 conducted by GC with MRS. Locations 1,2,3,4 were not measured at night, due to minimal changes between evening and night noise levels

[b] From the EMT Lease Renewal FEIR

As a condition of the Applicant's EOF permit, permit conditions 27B and 27C require quarterly monitoring of noise levels near the EOF. For the years 2006 and 2007, these noise levels averaged 73.4 dBA along the EOF fence line, ranging from 61.6 dBA to 79.2 dBA. When noise levels are above a predetermined baseline (the baseline ranges from 62 dBA to 80 dBA, with an energy average of 74.5 dBA, along the fenceline), the facility investigates the source of the noise and conducts repairs, which have included fan belt and bearing replacements on the heaters. Two locations, the northern fence

line near the compressors and the Sandpiper Golf Course11th-hole tee, have consistently shown small exceedances of the predetermined baseline levels.

Figure 4.10-2
Noise Measurements Locations



4.10.2 Regulatory Setting

Noise is regulated at the Federal, State, and local levels through regulations, policies, and/or local ordinances. Local policies are commonly adaptations of Federal and State guidelines, based on prevailing local conditions or special requirements. These guidelines have been developed at the Federal level by the U.S. EPA, the Federal Aviation Administration (FAA), the Federal Highway Administration (FHWA), and the U.S. DOT. Policies have been implemented at the State level, by the now-defunct California Office of Noise Control and by the California Department of Transportation (CalTrans). A summary of the regulatory setting for noise is provided below.

Federal

The FAA maintains jurisdiction over flight patterns for all aircraft. Federal Air Regulation (FAR) 36 establishes noise level criteria and measurement procedures for civilian fixed-wing aircraft. No specific regulations have been adopted for civilian helicopters. The

FHWA has established traffic-noise design levels for use in the planning and design of federally funded highway projects (see Table 4.10-2). These levels are based on the category of activity through which the freeway passes. Categories range from A, for areas of extraordinary significance, to E for interior noise impacts, as described below. Category D is applicable to undeveloped lands and has no specific Leq or L10 value.

Under the authority of the Noise Control Act of 1972, the U.S. EPA has established noise emission criteria and testing methods (40 CFR Chapter 1, Subpart Q). These criteria apply to interstate rail carriers and to some types of construction and transportation equipment.

The DOT has established allowable noise levels for motor vehicles (49 CFR Chapter III, Part 325). These standards address measurement protocols for measuring highway noise, instrumentation, and stationary testing procedures. In addition, the Department of Defense has established noise compliance requirements.

Table 4.10-2
FHWA Traffic Noise Design Levels

Category	Category Description	L_{eq}	L_{10}
A	Tracts of land in which serenity and quiet are of extraordinary significance. May include parks, open spaces, or historic districts.	57	60
B	Picnic areas, recreation areas, playgrounds, and other parks. Also, residences, hotels/motels, churches, libraries, and hospitals.	67	70
C	Developed lands.	72	75
E	Residences, hotels/motels, churches, libraries, and hospitals.	52 (interior)	55 (interior)

Notes: These noise levels are based on hourly L_{eq} or hourly L_{10} levels for interior and exterior exposure of surrounding land uses. Category D is applicable to undeveloped lands and has no specific L_{eq} or L_{10} value, and therefore is not mentioned here. L10 is defined as the noise level that is exceeded 10 percent of the time.

Source: FHWA 1982

State

The California Administrative Code, Title 4, which applies to airports operating under permit from the CalTrans Division of Aeronautics, defines a noise-impacted zone as any residential or other noise-sensitive use with CNEL 65 and above. The California Administrative Code, Title 2, establishes CNEL 45 as the maximum allowable indoor noise level, resulting from exterior noise sources, for multi-family residences.

The California Streets and Highways Code, section 216 (Control of Freeway Noise in School Classrooms) requires, in general, that CalTrans abate noise to 55 dBA, L_{10}, or 52 dBA, L_{eq} or less. CalTrans Policy and Procedure Memorandum P74-47 (Freeway Traffic Noise Reduction, September 24, 1974) outlines the CalTrans policy and responsibilities related to transportation noise. In the California Government Code, section 65302, CalTrans is also required to provide cities and counties with a noise contour map along State highways. The State Motor Vehicle Code includes regulations related to the selling and use of vehicles that do not meet specified noise limits.

The California Office of Noise Control has published guidelines for evaluating land use compatibility with various noise environments. According to these guidelines, golf courses are compatible with L_{dn} values up to 70 dBA (SBC 1986).

Local

The Goleta General Plan/Coastal Land Use Plan Noise Element, Section 9, describes the policies of the city of Goleta in regards to noise. Policy NE.1.1 describes land use compatibility standards. The standards and criteria used to establish the compatibility of land use and noise exposure are shown below in Table 4.10-3.

Policy NE.1.4 requires acoustical noise studies for applicable projects and NE 1.5 requires appropriate acoustic soundproofing.

Policy NE.5 addresses industrial noise sources. Policies NE.5.1, 5.2 and 5.4 addresses mitigation measures, equipment maintenance and noise barriers for new or modified industrial sources. Policy NE.5.6 specifically addresses the reduction of noise at the Applicant's EOF: "*The City shall continue to monitor noise at the Venoco Ellwood Onshore Oil and Gas Processing Facility to determine whether noise levels exceed required standards and may require Venoco to implement measures that will avoid violations of the standards. The City shall require that any major facility upgrades include measures or designs that ensure noise levels generated by the facility are in compliance with the plant's operating permit.*"

Policy NE.6 addresses nuisance and construction noise. Specifically, Policy NE.6.4 specifies "*Noise-generating construction activities for projects near or adjacent to residential buildings and neighborhoods or other sensitive receptors shall be limited to Monday through Friday, 8:00 a.m. to 5:00 p.m. Construction in nonresidential areas away from sensitive receivers shall be limited to Monday through Friday, 7:00 a.m. to 4:00 p.m. Construction shall generally not be allowed on weekends*."

Table 4.10-3
General Plan Land Use and Noise Compatibility

Land Use Category	Community Noise Exposure (Ldn or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential—low density	50–60	60–65	65–75	75–85+
Residential—multiple family	50–60	60–65	65–75	75–85+
Transient lodging—motels and hotels	50–65	65–70	70–80	80–85+
Schools, libraries, churches, hospitals, and nursing homes	50–60	60–65	65–80	80–85+
Auditoriums, concert halls, and amphitheaters	NA	50–65	NA	65–85+
Sports arenas and outdoor spectator sports	NA	50–70	NA	70–85+
Playgrounds and neighborhood parks	50–70	NA	70–75	75–85+
Golf courses, riding stables, water recreation, and cemeteries	50–70	NA	70–80	80–85+
Office buildings, business commercial, and professional	50–67.5	67.5–75	75–85+	NA
Industrial, manufacturing, utilities, and agriculture	50–70	70–75	75–85+	NA

Notes:
Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements shall be made and needed noise insulation features shall be included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.
NA: Not applicable.
Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

Policy NE.6.5 states, in regards to construction noise, that, "*To the extent practicable, adequate buffers shall be maintained between noise generating machinery or equipment and any sensitive receivers. The buffer should ensure that noise at the receiver site does not exceed 65 dBA CNEL. For equipment that produces a noise level of 95 dBA at 50 feet, a buffer of 1600 feet is required for attenuation of sound levels to 65 dBA.*"

Policy NE.7.1 places "primary emphasis on the control of noise [to] be accomplished at the source by reducing the intensity of noise generated".

The Santa Barbara County regulations regarding industrial facilities specify 75 dB L_{dn} as the maximum volume of sound measured at any point along the property line of an industrial facility (Santa Barbara County 2007). The Santa Barbara County Noise Element (Santa Barbara County 1986) includes a recommended policy that states:

> *"In the planning of land use, 65 dB Day-Night Average Sound Level should be regarded as the maximum noise exposure compatible with noise-sensitive uses unless noise mitigation features are included in project designs."*

Policy No. 9 of the Noise Element states:

> *"Noise level limits, applicable to new noise sources, should be incorporated into all commercial and industrial zoning districts and into conditional use permits."*

The sound levels within the UCSB campus are governed by the Long Range Development Plan (LRDP) (UCSB 1990). The LRDP Land Resources section specifies:

> *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values.*
>
> *At Coal Oil Point, the maximum allowable sound level shall not exceed 60 decibels on the A-weighted scale (1980 LRDP Development Standard, as amended). (30240(b).17)*
>
> *The following noise sources are not subject to the maximum sound levels established in policy no. 30240(b).17. a) Noise from construction and maintenance activities between 7:00 a.m. and 8:00 p.m. b) Noises of safety signals, warning devices, and emergency pressure relief valves. c) Noises from moving sources such as tractors, automobiles, trucks, airplanes, etc.*

Permit conditions 27B and 27C placed on the Applicant's EOF facility specifically address noise and noise monitoring requirements.

4.10.3 Significance Criteria

A noise impact is considered significant if noise levels from project operations exceed the local policies and noise standards. Thus, the noise policies of the Santa Barbara county and the city of Goleta Environmental Thresholds Guidelines should be adhered to, as well as the UCSB LRDP of 1990 sections 30240(b).16 through 30240(b).18, for the areas of the Campus. These noise policies are summarized below.

- Noise which generates levels exceeding 65 dB CNEL that could affect sensitive receptors (city of Goleta, Santa Barbara county);

- Outdoor areas of noise sensitive uses that are subject to noise levels in excess of 65 dBA CNEL would generally be presumed to be significantly impacted by noise. A significant impact would also generally occur where interior noise levels cannot be reduced to 45 dBA CNEL or less (city of Goleta, Santa Barbara county);

- A project generally has a significant effect on the environment if it increases substantially the ambient noise levels for noise sensitive receptors in adjoining areas, i.e., when ambient noise levels affecting sensitive receptors are increased to 65 dBA CNEL or more. However, a significant affect may also occur when ambient noise levels affecting sensitive receptors increase substantially, but remain less than 65 dBA CNEL, as determined on a case-by-case basis (city of Goleta, Santa Barbara county);

- Exposure of persons to, or generation of, excessive ground borne vibration or ground borne noise level; and

- At Coal Oil Point, the maximum allowable sound level shall not exceed 60 dBA excluding construction activities (UCSB).

A substantial increase in noise levels would be considered to be in excess of three dBA over background levels (Los Carneros Village EIR 2007).

4.10.4 Impact Analysis and Mitigation

Noise would be generated from the EOF construction, EOF operations, installation of the pipeline and demolition of the EMT. Noise levels were estimated based on construction equipment lists and EPA references (EPA 1971) on noise generated from construction equipment, and from the manufacturer literature on operations of the EOF equipment. Estimated noise levels from the proposed Project activities at the closest sensitive receptor locations shown above in Figure 4.10-2, including background noise and terrain effect, are tabulated in Table 4.10-4.

Terrain plays an important role in reducing noise impacts, as some receptor locations are shielded from activity areas, such as the Bacara Resort from the EOF, and some residences from the pipeline installation boring location north of Highway 101. The

extent of reduction by terrain was estimated by utilizing the concept of "insertion loss" and calculations from the FHWA and ANSI. When a noise barrier is located between a source and a receptor, the difference in noise levels achieved at the sensitive receptors is called "insertion loss" – and is the difference in noise level after and before installation of the noise barrier. The procedures described below are in accordance with the American National Standards Institute ANSI S12.8-1998, "Methods for Determining the Insertion Loss of Outdoor Noise Barriers," (ANSI 1998).

Table 4.10-4
Noise Impacts

Activity	Receptor	SEL Max	CNEL	Acceptable?
Pipeline Construction				
Drilling at night	At Bacara Resort and Spa, due to drilling at the Applicant's EOF west end*	51	60	Y
Drilling at night	At closest house to drilling location next to Calle Real*	68	69	N
Pipeline Construction	At Vereda Leyenda and Calle Real	87	77	N
EOF Construction				
EOF Modifications	at Sandpiper Golf Course11th-hole	83	72	N
EOF Modifications	at Bacara Resort and Spa *	55	57	Y
EOF Operations				
Generator Sets - unmitigated	at Sandpiper Golf Course11th-hole	86	92	N
Generator Sets - unmitigated	at Bacara*	51	59	Y
Generator Sets - mitigated	at Sandpiper Golf Course11th-hole	60	69	Y
Generator Sets - mitigated	at Bacara Resort and Spa *	25	55	Y
EMT Decommissioning				
Equipment Removal	at EMT access road	94	82	N
Equipment Removal	at Beach	77	66	N
Equipment Removal	at closest residence	72	62	Y
Offshore Removal	at Beach	68	62	N

Note: * Includes reductions due to terrain effects (-12 dBA from EOF to Bacara and -8 dBA from Calle Real boring location to the closest residence).

Noise barriers attenuate sound in four ways: diffraction, absorption, reflection, and reduced transmission. In the diffraction mechanism, noise is reduced by extending the distance that noise waves travel from the source to the receiver . Some noise energy is

absorbed by the noise barrier material. Some noise is transmitted through the barrier, but at a reduced energy level. And some noise is reflected from the barrier and thus does not reach the receiver.

Transmitted noise is typically not taken into consideration when modeling noise attenuation by noise barriers, because this noise typically is significantly lower than the source noise (FHWA 2000). The highest noise is from the diffracted portion of the attenuated noise.

The diffracted portion of the noise was modeled according to the method outlined in the FHWA "Highway Noise Barrier Design Handbook" (FHWA 2000). This method is frequency-specific as attenuation by a noise barrier is more effective for higher frequencies. The technique uses a calculation method based on the height of the barrier, the distance between the source and the barrier, the height and distance to the receptor, and the frequency of the noise to produce what is called a Fresnel number. The Fresnel number is a dimensionless number that is used to estimate the level of noise attenuation reduction associated with the barrier. The noise sources associated with the Project would have a range of sound frequencies. The extent of attenuation is a function of the frequency of the sound. Higher frequencies attenuate more than lower frequencies. For example, attenuation due to an eight-foot wall placed 50 feet from activities would attenuate from between minus five dBA for a low frequency of 32 Hz to an attenuation level of almost minus 13 dBA for a high frequency of 16,000 Hz at a receptor located 500 feet from the source. The use of a lower frequency would constitute a worst-case scenario (the lowest attenuation), and was therefore used in the noise model to estimate the level of noise reduction associated with the terrain in the area.

Impact N-1: Increased Noise from EOF Operations

The proposed Project would increase the noise levels from operations at the EOF (Potentially Significant, Class II).

Impact Discussion

Currently, noise sources associated with the EOF consist mostly of the HIRT burners, gas processing equipment at the LOCAT and the compressor engines. Installation of the generator sets would generate noise at the Sandpiper Golf Course to the south and east of the EOF. GE literature on the generators specifies the noise levels generated by the generator sets for both exhaust noise and engine noise. These noise levels

would produce an estimated 86 dBA SEL and 92 dBA CNEL at the Golf Course fairway for the unmitigated installation associated with exhaust noise and engine noise (no mufflers, sound walls or enclosures). Noise levels at the Bacara Resort and Spa from the unmitigated installation would be below 60 dBA (both SEL and CNEL) due to the reduction in noise from the terrain between the EOF and the Bacara Resort and Spa. However, noise levels would increase from baseline by about six dBA for both the SEL and the CNEL at the Bacara Resort and Spa due to the exhaust noise and engine noise. Therefore, impacts at the Golf Course and at the Bacara Resort would be considered a significant impact.

The Applicant has indicated that some mitigation would be installed. However, the extent of mitigation has not been determined. In the absence of mitigation, the impact would be considered significant.

Mitigation Measures

N-1a. EOF Operations Noise Mitigation. The Applicant shall install noise mitigation on the generator sets, including exhaust mufflers and noise enclosures, to reduce the impacts to nearby receptors to below the baseline levels specified in the existing permit**.**

Rationale for Mitigation

Installation of exhaust mufflers and noise enclosures, which completely surrounds the generator set, would substantially reduce the noise from the generators. Sound enclosures have demonstrated an ability to reduce noise levels from engines by at least 15 dBA (Soundseal 2007). Advanced silencers and mufflers are available that can reduce noise levels from the exhaust system by between 10 dBA for industrial grade up to 40 dBA for hospital grade silencers (Universal 2006). These technologies are readily available and well proven. They would reduce noise levels from the generators sets at the Golf Course to below 60 dBA SEL and below 69 dBA CNEL. At the Bacara Resort and Spa, increases in noise levels would be reduced to less than 1 dBA SEL and CNEL.

Impact N-2 Noise from Pipeline Construction Activities

Pipeline construction machinery would produce short-term noise in the vicinity of the pipeline right-of-way (Potentially Significant, Class II).

Impact Discussion

Short-term noise impacts would occur due to construction of the pipeline in areas where sensitive receptors are close to the pipeline right-of-way (ROW). Operation of the pipeline would have no noise impacts.

Currently, day background L_{eq} noise levels along the proposed pipeline ROW, in the vicinity of the residences on the north side of Highway 101, are in the range of 60 dBA to 65 dBA. The influences on the baseline noise levels are primarily due to Highway 101.

Noise levels from pipeline construction machinery were modeled using documented noise levels (EPA 1971) from typical pipeline construction machinery and equipment. Noise at the closest residence to the pipeline ROW along Calle Real could reach 87 dBA SEL during peak construction periods, with a CNEL of 77 dBA. This impact would be short term, but it would be potentially significant.

Depending on the terrain, soil properties, and the boring machine used for pipeline construction, boring activities may be necessary during evening and night hours as there are periods during a boring installation when the bore should not be stopped due to the difficulties associated with re-starts. However, both boring locations (at the EOF and along Calle Real) are somewhat shielded from sensitive receptors by terrain.

If boring is conducted during the evening and night hours, noise levels at the closest residence to the drilling location at Calle Real north of Highway 101 could be a peak of 68 dBA SEL with a time average value of 69 dBA CNEL, which would be a potentially significant impact.

Impacts from nighttime drilling at the Applicant's EOF on the Bacara Resort and Spa would also be reduced by the terrain. Noise levels at the Bacara Resort could be an estimated 51 dBA maximum SEL and a time averaged value of 60 dBA CNEL. Although this level is below the 65 dBA CNEL significance threshold, this would be an increase over night time background noise levels of 5 dBA SEL and about 1 dBA CNEL, which would be a potentially significant impact.

Mitigation Measures

N-2a. Noise Reduction Plan. The Applicant shall prepare a noise reduction plan which shall be approved by Santa Barbara county and the city of

Goleta. The plan would include, but not be limited to, the following measures:

- Post notifications to the residents and landowners within 1,000 feet of the Project site about the planned pipeline construction near their residence/land at least one week before construction at that location;

- Ensure that construction activities do not occur between 4:00 p.m. and 7:00 a.m. on weekdays in non-residential areas, and 5:00 p.m. and 8:00 a.m. on weekdays in or near residential areas , and not at all on Saturdays, Sundays or holidays, unless specifically required by permits or at the direction of the county/city staffs;

- Ensure that all internal combustion engines are properly maintained and that mufflers, silencers, or other appropriate noise-control measures function properly;

N-2b. **Noise from Boring Reduction Measures.** If boring under Highway 101 or any other noise-producing activity during the pipeline construction is required to be conducted during the evening or night hours (from 5 p.m. to 8 a.m.), the Applicant shall install appropriate mufflers and/or temporary noise barriers to minimize noise at the residences and the Bacara Resort.

Rationale for Mitigation

Limiting the hours of construction would reduce impacts during times when the noise could produce the most impact. Notification of the landowners would ensure that they are prepared and could potentially help reduce impacts by keeping windows closed and limiting outside activities. Ensuring that all machinery is maintained would ensure that operation would produce the lowest possible noise level. Quiet mode operation during evening and night hours would help to ensure that noise impacts to nearby residences are minimized.

Installing noise barriers can reduce noise levels by up to 15 dBA. The noise barriers would help to reduce evening and night noise from the boring activities.

Impact N-3 Noise from EOF Construction Activities

EOF construction could produce short-term noise to the Golf Course (Less than Significant, Class III).

Impact Discussion

Short term construction activities at the EOF associated with installation of the generator sets, the CO2 removal system and other modifications could produce periodic exceedances of 70 dBA at the golf course 11th-hole fairway. However, as these noise levels would be short term and golf courses are not considered sensitive receptors, this impact would be considered less than significant (Class III).

Impact N-4 Noise from EMT Decommissioning

EMT Decommissioning construction could produce short-term noise to the mesa and Coal Oil Point beach area (Less than Significant, Class III).

Impact Discussion

Short-term construction activities at the EMT associated with removal of the onshore and offshore equipment could produce periodic exceedances of 60 dBA at the Coal Oil Point beach. UCSB states in their Long Range Development Plan policies that noise levels should not exceed 60 dBA at Coil Oil Point beach, excluding noise associated with construction activities. As the decommissioning would be considered construction activities, this would be considered an adverse but less than significant impact.

Noise impacts at the closest residence to the EMT would be below 65 dBA CNEL and would be considered adverse but less than significant. Noise impacts on the mesa area near the EMT would be up to 82 dBA CNEL. However, as these noise levels would be short term and the immediate area around the EMT is not considered a sensitive receptor, this impact would be considered less than significant.

Extension of Life Impact

The Applicant has stated that the proposed Project would not increase the life of the existing South Ellwood Field Facilities, which is currently defined by the operational life of Platform Holly until 2040, and would likely reduce the overall duration of oil and gas production from existing facilities due to more efficient extraction of the resource. However, it is possible that increased oil and gas production from new wells drilled into the existing and proposed leases, formations (Lower Sespe) and fault blocks (North Flank and Eagle Canyon) could produce economically viable resources for a longer-than-expected period and increase the life of the existing facilities. Therefore, the

impacts identified in Table 4.10-5 have the potential to occur over a longer period than assumed for the proposed project, exacerbating potentially adverse impacts.

Increasing the project duration would extend the period where adverse noise could impact nearby populations and would be considered potentially significant but mitigable (Class II).

Table 4.10-5
Summary of Noise Impacts and Mitigation Measures

Impact	Impact Class	Mitigation Measures
N-1. Increased noise from EOF Operations	Class II	**N-1a** EOF Operations Noise Mitigation. The Applicant shall install noise mitigation on the generator sets including exhaust mufflers and noise enclosures to reduce the impacts to nearby receptors.
N-2. Noise from pipeline Construction Activities	Class II	**N-2a** Preparation of a noise reduction plan. **N-2b** Noise reduction measures for nighttime boring operations.
N-3. Noise from EOF Construction Activities	Class III	None required
N-4. Noise from EMT Decommissioning Activities	Class III	None Required

4.10.5 Impacts of Alternatives

Detailed descriptions of the various alternatives have been provided in Section 3, Alternatives. This section provides a discussion of the noise impacts of the various alternatives.

No Project Alternative

Under the No Project Alternative, the lease extension would not be granted, modifications to the EOF would not be conducted, the pipeline would not be installed, and the EMT would not be decommissioned. Noise impacts N-1, N-2, N-3 and N-4 would not exist.

Currently, lease agreements for the operations of the EMT will expire in 2013 and/or 2016 (see Section 2.0, Project Description). It is assumed that, under the No Project Alternative, after the lease expirations, the Applicant would pursue alternative means of crude oil transport such as pipeline or truck transportation. The impacts of these

transportation modes are described in the Venoco Ellwood EMT Lease Renewal Project Draft EIR (CSLC 2007). Any future crude oil transportation options would be subject to appropriate agency review and approval.

No EOF Modifications

There would be no new impacts with this alternative.

Processing at Platform Holly Alternative

Under this Alternative, all crude and gas processing would be conducted at Platform Holly. EOF operations would be limited to electrical switchgear operations, gas compression, and crude oil storage and pumping. Noise impacts from pipeline construction would be the same as for the proposed Project, impact **N-2** and mitigation measures **N-2a** and **N-2b** would apply. Impacts from EMT decommissioning would be the same as the proposed Project's impact **N-4** and mitigation measures would apply.

Impacts associated with decommissioning and removal of the EOF equipment would be similar to, but longer in duration than impact **N-3**. This would involve the use of trucks and construction equipment, such as cranes, front loaders, etc.

Impacts from EOF operations would be less than current operations and impact **N-1** and associated mitigation measures would no longer apply.

Impact N-5 Noise from Platform Holly Construction and associated Truck Traffic

Noise impacts would result from Platform Holly Construction and Truck traffic along the EOF and Bacara Access Road (Less than Significant, Class III).

Impact Discussion

As construction would take place offshore at Platform Holly, some noise would be generated from these activities. However, as Platform Holly is located two miles from sensitive receptors, noise levels might be detectable but would not produce impacts. Additional trucks that use the EOF and Bacara Resort access road to transport materials to the Ellwood Pier would generate some additional noise. Estimated truck trips would total a peak level of 15 round trips per day, which would generate an estimated 51 dBA equivalent noise level over the daytime period (at 50 feet from the

roadway). This would be less than the background noise level measured at the Bacara Resort and would, therefore, constitute an adverse but less than significant impact.

Las Flores Canyon Processing: Offshore Gas and Onshore Oil Pipeline Alternative

Under this Alternative, all crude and gas processing would be conducted at the ExxonMobil LFC facility. EOF operations would be removed completely. Noise impacts from the pipeline construction would be the same as for the proposed Project. Impact **N-2** and mitigation measures **N-2a** and **N-2b** would still apply. Impacts from EMT decommissioning would be the same as the proposed Project's impact **N-4**, and no mitigation measures would be required.

Impacts associated with decommissioning and removal of the EOF equipment would be similar to, but longer in duration than, impact **N-3**. This would involve the use of trucks and construction equipment, such as cranes, front loaders, etc.

Impacts from EOF operations would be less than for current operations, as all EOF operations would be removed, and impact **N-1** and associated mitigation measures would no longer apply.

As this alternative would involve installation of an offshore gas pipeline, trucks and equipment would need to be transported to the Ellwood Pier utilizing the EOF access road, which would pass by the Bacara Resort. Impacts would be similar to those detailed in impact **N-5**, and no mitigation measures would be required.

Impacts at the LFC due to construction and modification of the LFC facilities to allow for processing the Ellwood crude and gas would generate noise. However, the LFC is remote from sensitive receptors and the noise impacts in the vicinity of the LFC would be less than significant.

Las Flores Canyon Processing: Offshore Gas and Offshore Oil Pipeline Alternative

Under this Alternative, all crude and gas processing would be conducted at the ExxonMobil LFC facility. EOF operations would be removed completely. The crude/emulsion pipeline and power cable from Platform Holly to the LFC would be constructed offshore along with the offshore gas pipeline.

The noise impacts would be the same as the two alternatives discussed above, Platform Holly processing, and the processing at LFC with onshore pipeline. However, as additional pipe would need to be transported offshore, additional trucks would need to utilize the EOF access road and pass by the Bacara Resort. Truck traffic levels are estimated to be only a few additional truck trips per day, which would be an adverse but less than significant impact, the same as impact **N-5** above.

As the proposed Project onshore crude pipeline would be constructed offshore under this alternative, impact **N-2** would no longer exist in regards to noise impacts along the onshore pipeline ROW.

4.10.6 Cumulative Projects Impact Analysis

No other industrial projects are proposed in the vicinity of the EOF or EMT that would contribute to increased noise at the same sensitive receptors as would be exposed to the proposed Project or alternative project noise. The residential and commercial projects proposed in the Project area would contribute to the background noise; however, because operations of the proposed Project would not have any noise impacts on sensitive receptors, it would not contribute to the cumulative impacts.

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4.10 NOISE 4.10-1
4.10.1 Environmental Setting....4.10-1
Definitions....4.10-1
Effects on Humans 4.10-1
Effects on Wildlife 4.10-4
Project Area Overview....4.10-4
4.10.2 Regulatory Setting 4.10-7
Federal 4.10-7
State 4.10-8
Local 4.10-9
4.10.3 Significance Criteria....4.10-11
4.10.4 Impact Analysis and Mitigation 4.10-12
Impact N-1: Increased Noise from EOF Operations....4.10-14
Impact N-2 Noise from Pipeline Construction Activities....4.10-15
Impact N-3 Noise from EOF Construction Activities 4.10-17
Impact N-4 Noise from EMT Decommissioning 4.10-18
Extension of Life Impact 4.10-18
4.10.5 Impacts of Alternatives 4.10-19
No Project Alternative....4.10-19
No EOF Modifications....4.10-20
Processing at Platform Holly Alternative....4.10-20
Impact N-5 Noise from Platform Holly Construction and associated Truck Traffic....4.10-20
Las Flores Canyon Processing: Offshore Gas and Onshore Oil Pipeline Alternative....4.10-21
Las Flores Canyon Processing: Offshore Gas and Offshore Oil Pipeline Alternative....4.10-21
4.10.6 Cumulative Projects Impact Analysis....4.10-22

Table 4.10-1 Baseline Noise Levels in the Project Area....4.10-6
Table 4.10-2 FHWA Traffic Noise Design Levels 4.10-8
Table 4.10-3 General Plan Land Use and Noise Compatibility....4.10-10
Table 4.10-4 Noise Impacts 4.10-13
Table 4.10-5 Summary of Noise Impacts and Mitigation Measures....4.10-19

Figure 4.10-1 Common Environmental Noise Levels 4.10-3
Figure 4.10-2 Noise Measurements Locations 4.10-7